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Before the
Federal Communications Commission
Washington, D. C. 20554

In the Matter of)

WT Docket No. 97-12

Amendment of the Amateur Service)

RM-8737

Rules to Provide For)

Greater Use of Spread)

Spectrum Communication)

Technologies)

To: The Commission

REPLY COMMENTS OF Steven K. Stroh, N8GNJ

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June 4, 1997

Introduction

Although I disclose my relevant affiliations in the next paragraph, the comments in this reply are my own, and do not necessarily represent any of the organizations I am affiliated with.

I am a member of the American Radio Relay League. I am a member of, and Secretary of Tucson Amateur Packet Radio (TAPR), and chairperson of its Networking Special Interest Group (NetSIG). I am also a participant in the Special Temporary Authority (STA) requested by TAPR for the purpose of developing and testing Spread Spectrum Systems that are more advanced than the Amateur Radio rules currently permit. Professionally I am a System and Network Administrator for a large company. I am a member of the Puget Sound Amateur Radio TCP/IP Group, who has constructed a network of Amateur repeaters and simplex links that utilize Internet technologies such as TCP/IP to create a low-speed, wireless extension of the Internet in the Seattle, Washington area.

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Overview

I feel that the Commission should simply delete certain restrictions in the Amateur Radio Service rules that are currently preventing state of the art Spread Spectrum techniques from being used in the Amateur Radio Service. In particular, Spread Spectrum modes should no longer be burdened with additional rules and regulations above and beyond that of other modes, such as power limits, identification, logging, or limitations on frequencies where Spread Spectrum can be used in the Amateur Radio Service. It seems to me that the existing Amateur Radio Service Rules (vastly oversimplified) of:

- “use the minimum power necessary to maintain communications”
- “Identify your transmissions a minimum of every 10 minutes”
- “Keep a record of any transmissions made with modulation methods that are not publicly documented”
- “don't deliberately interfere with a communication in progress”

are sufficient guidance for the design and operation of Spread Spectrum in the Amateur Radio Service.

Without these changes in the Amateur Radio Service rules, it is unlikely that Spread Spectrum will be widely used in the Amateur Radio Service, and that would be a loss, both for the Amateur Radio Service and the public at large who ultimately and directly benefit from innovations in telecommunications pioneered and developed by Amateur Radio operators.

Discussion

As I read the posted comments to RM8737, I was dismayed that some Amateur Radio operators and organizations seem threatened by the prospect of the widespread deployment of Spread Spectrum in “their” normal operating frequencies, including satellite, weak signal, and voice repeater operations. Basically, it seemed as though they could not bring themselves to trust that their fellow Amateur Radio Operators, who would might eventually use Spread Spectrum systems, would not deliberately harm their operating modes, and that protecting “their” frequencies was of more concern than the advancement of Amateur Radio.

Specifically, it seems to me that all Amateur Radio operators have a great deal of respect for what has been accomplished in putting Amateur Radio onto satellites, and would not implement designs or conduct operations *that are proven* to be detrimental to Amateur Radio satellite communications. Amateur Radio Spread Spectrum operations may, or may well not interfere with Amateur Radio Satellite communications. Experimentation will be necessary to discover this.

An excessive rules burden now, in the infancy of Amateur Radio Spread Spectrum, will likely stifle any chance of innovation from Spread Spectrum techniques in the Amateur Radio service. Imposition of rules requiring CW identification, and automatic power control, for example, would likely prevent the use of “off the shelf” Spread Spectrum components. If off-the-shelf components *can* be used, it is seems reasonable that several

parallel Amateur Spread Spectrum development efforts will result in at least one Spread Spectrum system unique to Amateur Radio could be available by the end of 1998.

An additional concern is the restriction of frequencies for Spread Spectrum operations in the Amateur Radio bands. My input is that the logical *initial* dividing line for where Spread Spectrum operations should be permitted is to permit Spread Spectrum operations on all Amateur Radio bands above 50 MHz. One of the most fertile areas of development in Spread Spectrum, one where Amateur Radio operators could make a significant contribution, is in the area of "lower frequency" Spread Spectrum operations using state of the art Spread Spectrum technology on frequencies such as 50-54 MHz.

I have no sympathy whatsoever for the concerns of non-Amateur Radio organizations such as the Part 15 coalition and Metricom, Inc. regarding Amateur Radio operations. The Commission has very clearly established the relative priorities of operations in shared bands such as 902-928 MHz. Commercial companies that manufacture products that use those bands, and make a profit from those products, understood quite clearly that as a condition of operation in those bands, their products must accept interference from licensed services in those bands such as Amateur Radio. If these commercial organizations are truly interested in Amateur Radio operations in shared bands not significantly impacting their established products and operations, they should be willing to offer to share technology and operational expertise to develop better, "friendlier" Amateur Radio systems.

Spread Spectrum offers a way to make effective use of Amateur Radio bands in a much more efficient manner. Spread spectrum has the potential to replace most other modulation methods currently in use in Amateur Radio, and can probably coexist with other modulation methods in the near future. Amateur Radio operators interested in employing digital systems and experimenting with high speed digital operations have been frustrated in their attempts to construct such systems on Amateur Radio bands on the 50 MHz, 144 MHz, 222 MHz, and 430 MHz bands because the existing users state "the band is already fully occupied, and cannot accommodate additional systems". This is especially true for systems that wish to use wide bandwidths, such as systems operating at a data rate of 56 Kilobits per second (and faster) that require 100 KHz (or more) of spectrum to operate.

My hope for Amateur Radio Spread Spectrum is that it can make use of the vast amounts of "dead airtime" on Amateur Radio frequencies above 50 MHz to accommodate digital systems and users on those frequencies. These frequencies are vastly underutilized because they are used primarily by a Frequency Modulation (FM) voice repeaters, which by their nature are only actually transmitting a few *minutes* of each day. Spread Spectrum techniques and systems can make effective use of this "dead airtime" with minimal impact to the existing users of those frequencies.

Amateur Radio Spread Spectrum technology could evolve rapidly if reasonable Spread Spectrum rules are adopted. An Amateur Radio Spread Spectrum system undoubtedly

will be designed to accommodate advances in technology and operational advances by way of "firmware updates", in much the same way as commercial telephone modems are "upgraded from disk". This means that "bugs" found in an Amateur Spread Spectrum radio could be rapidly disseminated by posting an update file on an Internet Web page. For instance, it is widely recognized that automatic power control is desirable in Spread Spectrum systems- the trick is how to make it work well in a point to multipoint environment such as typical Amateur Radio systems. With sufficient experimentation, an effective method to do so will no doubt be developed, and then this improvement can be downloaded and implemented. If identification proves to be a problem, that too can be implemented and downloaded. If SS is proven to be harmful to certain operations, then a "don't hop on these frequencies" update can be implemented and downloaded.

Conclusion

- An update of the Amateur Radio rules pertaining should remove the rules preventing state of the art Spread Spectrum technology from being used in Amateur Radio. There are already sufficient and appropriate rules and regulations in the Amateur Radio service. To require additional rules and regulations specific to Amateur Radio Spread Spectrum will almost certainly prevent the development and effective use of state of the art Spread Spectrum technology in the Amateur Radio service.
- Given the chance (reasonable regulations on Amateur Spread Spectrum), Amateur Radio has *much* to contribute the continued development of Spread Spectrum technology and techniques, especially effective ad-hoc networking and application of relevant Internet technology and techniques to VHF/UHF frequencies where Spread Spectrum is not yet widely used.
- Amateur Spread Spectrum could evolve and rapidly deploy advances in Spread Spectrum technology by making use of "downloading new code" into Spread Spectrum systems, likely from Internet Web pages such as TAPR's Web page (<http://www.tapr.org>). Problems that are identified with Amateur Radio Spread Spectrum operations could be corrected through the use of a "download new code" capability such as is currently employed in commercial telephone modems.
- I wholeheartedly endorse the comments of Phil Karn KA9Q, Lyle Johnson WA7GXD, and TAPR. I think that their views represent fairly the promise of Spread Spectrum experimentation and development in the Amateur Radio Service.

I thank the Commission for this opportunity to present my viewpoints on this matter to them.

Steven K. Stroh, Amateur Radio callsign N8GNJ